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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/699,095
Filing Date: October 31, 2003
Appellant(s): VERSER ET AL.

Floron C. Faries
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed October 5, 2007 appealing from the Office action mailed February 27, 2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The following are the related appeals, interferences, and judicial proceedings known to the examiner which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal:

Applications SN 10/660,990 and SN 10/849,393, both share the same continuation in part parent application SN 08/893,200 (US 6,239,235) as the instant appealed application are also in the process of appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

4,424,341	Hanson et al.	1-1984
5,597,892	Hanson	1-1997
6,204,344	Kendrick et al.	3-2001
EP 0 432 555 A2	Tormaschy et al.	6-1991

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

(A) Claims 1-13,15-20 and 28-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kendrick et al. (US 6,204,344) in view of Hanson (US 5,597,892).

The instant claims are directed to a process for producing solid polymer particles by conducting slurry polymerization in a loop reactor, passing the intermediate polymer slurry product through a heated conduit to producing a concentrated intermediate product and a vapor, and separating the vapor from the concentrated intermediate product by centrifugal force in a cyclone.

Kendrick teaches conducting a slurry polymerization process in a loop reactor to produce a polymer slurry intermediate product and recovering the polymer solid by passing the polymer slurry intermediate product to a heating conduit, then a first flash tank to separate the vapor of the diluent and unreacted monomers from the intermediate product, the vapor is then transferred to a first cyclone to separate the entrained polymer solids from the vapor, then passing the vapor to a second conduit, a second flash tank and a second cyclone to further separate the solids from the vapor,

and finally passing the vapor the through a filter for recycling (col. 8, line 33 to col. 11, line 58, and Examples 1-4).

Apparently, Kandrick uses the flash tank rather than the cyclone of the instant claims to separate the vapor from the intermediate product. Hanson teaches using a cyclone to separate the vapor of the diluent and unreacted monomers from the intermediate product (col. 2, lines 10-63). Hanson's cyclone has the same function of separating the vapor and polymer solids as Kendrick's flash tank.

Thus, it would have been obvious to a skilled artisan at the time the invention was made to employ Hanson's cyclone to replace Kendrick's flash tank and cyclone to simplify Kendrick's process and in the absence of any showing of criticality and unexpected results.

It is noted that the prior art does not expressly disclose separation of the polymer solids from the vapor in the cyclone by centrifugal force; however, it is understood in the art that the cyclone is designed to use centrifugal force to separate the solid material form the non-solids. It is noted that the prior art does not expressly disclose the percentage of the vapor to be separated from the polymer slurry intermediate product, the length of the receiving zone, and the residence time for drying the polymer solids. However, any such differences are deemed to be result effective variables that one of ordinary skill in the art would be expected to manipulate to advantage based on a consideration of both economic and performance factors. If applicants believe that one or more limitations are critical to the invention, then applicants should limit the claims to

reflect such critical limitations as well as indicate where in the specification such critical limitations are discussed and demonstrated.

The limitations of all claims have been considered and are deemed to be within the purview of the prior art.

(B) Claims 1, 15, 28-31, 33 and 36-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tormaschy et al. (EP 0 432 555 A2) in view of respectively Hanson (5,597,892) and Hanson et al. (US 4,424,341).

Tormaschy teaches an olefin polymerization process using a loop reactor under steady state operating conditions, wherein ethylene, hexene and isobutene are fed at constant rates to the loop reactor at the pressure of 600 psig and the polymer solid is withdrawn at a rate of 1,635 lbs/hr with solid content of 63 wt.% (page 5, lines 24-52; and Example of page 7, line 41 to page 8, line 43). The polymer solid content of 63 wt.% is calculated from the data of the Example: 1635/(916+39+1.6+1636)=63%. Apparently, Tormaschy's loop reactor is conducted in a continuous mode wherein the starting materials and diluent are introduced to the reactor at constant rates and the product and diluent are withdrawn from the reactor at constant rates.

It is noted that Tormaschy does not provide the details regarding the separation of the polymer slurry intermediate withdrawn from the loop reactor. Separating the polymer slurry intermediate by cyclone or a flush tank coupled with a cyclone are conventional practice at the time of the invention and such is demonstrated in Hanson

(5,597,892) (col. 2, line 10 to col. 3, line 27) and Hanson et al. (US 4,424,341) (col. 3, line 5 to col. 4, line 17).

Thus, it would have been obvious to a skilled artisan at the time the invention was made to employ Hanson (5,597,892) or Hanson et al. (US 4,424,341) to Tormaschy's polymerization process since such is conventional done in the art to separate the polymer product and recycle the reaction diluent and thus optimize the productivities and thus lower the cost and in the absence of any showing criticality and unexpected results.

(10) Response to Argument

(A) Appellants argue that Kendrick et al. (US 6,204,344) is not prior art because the present claims are fully supported by the specification of the continuation in part parent application 08/893,200, now US 6,239,235 (Hottovy et al), and thus have an earlier effective filing date than Kandrick. Appellants further cite the following section as support: Hottovy, col. 2, lines 11-14 and 60-67; col. 3, lines 7-9 and 40-59; col. 4, lines 32-36; col. 5, lines 6-11; Hanson '341, col. 3, lines 15-28; col. 4, lines 9-12.

First of all, it is the examiner's position that the only portion incorporated by reference from Hanson to Hottovy is the high pressure flash design of Hanson in view of the disclosure in lines 51-54 of Hottovy: "This high pressure flash design is broadly disclosed in Hanson and Sherk, U.S. Pate. No. 4,424,341 (Jan. 3, 1984), the disclosure of which is hereby incorporated by reference". Apparently, the phase of "the disclosure of which" refers the prior sentence of "This high pressure flash design is broadly disclosed in Hanson and Sherk, U.S. Pate. No. 4,424,341 (Jan. 3, 1984)" rather than

the entire disclosure of U.S. Pat. No. 4,424,341. When the entire disclosure of a patent is intended to be incorporated, a phrase similar to "the entire disclosure of the patent is incorporated herein by reference" should have been used.

Secondly, Hottovy's polymerization process is limited to olefin polymer preparation only rather than the unspecified "solid polymer" of the instant claims.

Thirdly, even if the entire disclosure of Hanson '341 is properly incorporated to Hottovy, the instant claims are not support in the cited sections of Hottovy and Hanson '341 because the process disclosed in Hottovy together with Hanson '341 requires separation of the diluent vapor from the polymer slurry intermediate product in a flash tank first and then further separate the polymer particles entrained in the vapor by a cyclone rather than separating vapor from the polymer slurry intermediate product by centrifugal force in a cyclone as required by claims 1, 15, 28-31, 33 and 36. The examiner disagrees with the appellants' position that the disclosure of col. 4, lines 3-5 and 9-12 of Hanson '341 of "placing the cyclone 25 in the flash chamber 20, provides for processing (including the 'direct' processing) of the polymer slurry intermediate product via the cyclone 24". In view the description of Hanson '341 here, it is clear that the polymer slurry from the loop reactor must always enter the flash chamber of the flash tank first to be separated to the olefin polymer intermediate product and the diluent vapor first regardless of whether the cyclone is inside or outside of the flash tank, and the cyclone is for separating the entrained polymer from vapor only. Apparently, the combined disclosure of Hottovy and Hanson '341 does not support the limitation of

"separating the vapor from the intermediate product by centrifugal force in a cyclone" of appealed claim 1 or the limitation of "separating vapor from the heated discharge slurry via centrifugal forces" of appealed claim 8 as alleged by Appellants. The centrifugal force is only used to separate the entrained polymer from vapor according the disclosure of Hanson '341.

(B) Appellants argue that Tormaschy is completely silent with regard to a continuous withdrawal of slurry from the loop reactor and assert that Tormaschy incorporate the typical settling leg configuration and not a continuous withdrawal from the reactor.

This is incorrect. As shown in the above rejection, in the polymerization process conducted in Tormaschy's loop reactor, the starting materials and diluent are introduced to the reactor at constant rates and the product and diluent are withdrawn from the reactor at constant rates. One of ordinary skill would have recognized that polymerization conducted in these kind conditions is defined as a continuous process. Appellants assert that Tormaschy fails to disclose a discharge valve for continuously withdrawing a slurry from the reactor, therefore, Tormaschy's withdrawn process is not continuously as required by the appealed claims 28 and 37. On the contrary, the absence of the valve in the product withdrawn line (23) in Fig. 1 disclosed in Tormaschy only confirms that the withdrawn line is continuous just as the introduction lines of monomer and comonomer as shown in Fig. 1 where no valves are present in the lines because the starting materials are introduced to the reactor at constant rates (the synonym of continuous introduction).

Lastly, Appellants argue that Tormaschy does not teach or suggest continuously withdrawing a slurry having an increase in solids concentration as compared with the slurry in the reactor, as recited in claims 28 and 37. However, as shown in the only figure of Hanson (5,597,892) and Fig. 1 of Hanson et al. (US 4,424,341), the withdrawn outlet of a loop reactor is located at the bottom of the loop reactor, the slurry withdrawn from the outlet of bottom of the reactor inherently contains higher concentration of solid due to gravity. Therefore, one would have expected such a feature also exist in all of the cited references.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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Primary Examiner

Conferees:

James Seidleck
Supervisory Examiner

Romulo Delmendo
Appeal Specialist